**Supernovae from Blue Super giants**

Peculiar Type II Supernovae from Blue Supergiants

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**Supernovae, the extremely luminous explosions that are the catastrophic deaths of stars, are used directly and indirectly by astronomers of many disciplines. Cosmologists use type IA supernovae (different types explained in a moment) as powerful “standard candles” to probe the farthest rungs of the cosmic distance ladder. Astrochemists studying the interstellar medium (ISM) track supernovae feedback of heavier elements that enrich the ISM. Astrophysicists working on star formation look for evidence of supernovae-induced collapse of molecular clouds. If supernovae are such ubiquitous tools, then it must be essential to understand the actual supernova (SN) mechanism itself.**

**In 1987, the nearest SN since the invention of the modern telescope exploded in the Large Magellanic Cloud, and from it astrophysicists have learned an incredible amount. Unfortunately (or fortunately, depending on your perspective), this explosion, SN1987A, was a weird event. Deep pre-explosion images detected the progenitor as a blue supergiant star, similar to Rigel, the blue star in the constellation Orion (and the brightest star in Orion, despite the betaOrionis misnomer). However, most type II-P SNe are believed to be from red supergiants, like Betelgeuse, the red star in Orion. There are only a handful (~5) of likely blue-supergiant explosions (that have been published). Blue supergiants are large stars that have a spectral type of O or B, meaning that their effective temperature is very, very high. Red supergiants are also very large stars, but their effective temperature is much lower, usually in the spectral class of K or M. (Our Sun is a G star, which is hotter than K or M).**

**Supernovae (SNe) have been traditionally classified based upon their optical spectrum and the strength of certain spectral lines. At the first level of the hierarchical classification scheme, we have type I and type II SNe. Type I SNe do not show hydrogen in their spectrum, while type II SNe do. Type I SNe can then be further divided into type IA and type IB and type IC, although sometimes it is difficult to distinguish between IB and IC and so they are lumped together under “type Ib/c.” Type IA SNe do not show hydrogen or helium in their spectrum, but are dominated by strong silicon absorption lines. Type IB SNe show helium lines, while Type IC SNe show neither helium nor hydrogen. While type I SNe are further sub-classified based upon the presence or absence of certain spectral lines, type II SNe are further sub-classified based upon their time evolution of their luminosity (called a “lightcurve”). Type II-P SNe show a “plateau-like” light curve after peak while Type II-L show a more linear decline after peak.**